

## Some steps to help with hybridization (Method I)

① Draw the complete Lewis structure

- Find the VSEPR "formula" :  $A X_m E_n$

② Identify the number of  $\sigma$  bonds and lone pairs (on the central atoms) using the Lewis structure.

- The number of  $\sigma$  bonds =  $m$  (the # of surrounding atoms)
- The number of lone pairs =  $n$  (the # of pairs of valence electrons on central atom)

③ Identify the type of hybridization:

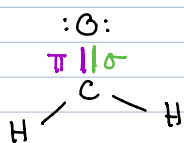
- If  $m+n = 4$  : Will need 4 hybrid orbitals of type  $sp^3$
- If  $m+n = 3$  : Will need 3 hybrid orbitals of type  $sp^2$
- If  $m+n = 2$  : Will need 2 hybrid orbitals of type  $sp$ .

\* NOTE: Any single electron in an unhybridized orbital will participate in a  $\pi$  bond

- This is the case when we have double or triple bonds

↳ One bond will be a  $\sigma$  bond and the others will be  $\pi$  bonds

↳ Ex:



- \*\*NOTES**
- Only orbitals that contain an electron participating in a  $\sigma$  bond or orbitals containing a lone pair NEED to be hybridized
  - Orbitals that contain an electron participating in a  $\pi$  do NOT need to be hybridized.
  - You need single electrons to form  $\pi$  bonds with another atom.



